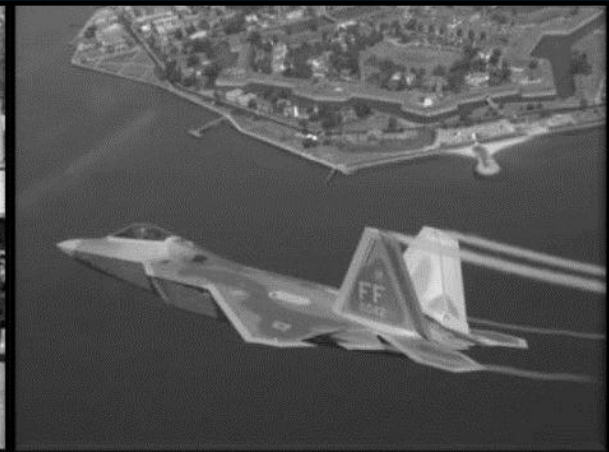




DEFENSE LOGISTICS AGENCY

AMERICA'S COMBAT LOGISTICS SUPPORT AGENCY



NATO Concern of Scarcity of Materials in Military Systems

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DLA Strategic Materials

May 23, 2012

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Agenda

- Issues
- NATO Research & Development
- Material Use and Origin
- AVT-196 Progress





Concern

- In 2009 NATO identified significant material supply chain vulnerabilities with potential impact on vehicle parts/components
- Exploratory team recommended a full Working Group effort
- Similar and parallel concerns raised in U.S.
- **Material shortages lead to production delays or stoppage & *security threats***



Nations Involved in NATO Research & Technology Organisation (RTO)

- NATO countries: ALB, BEL, BGR, CAN, CZE, DNK, EST, FRA, LVA, LTU, LUX*, NLD, NOR, POL, PRT, ROM, SVK, DEU, GRC, HUN, ISL*, ITA, SVN, ESP, TUR, GBR, and USA
 - * denotes countries not participating in RTO activities.
- Additional Partners
 - PfP: ARM, AUT, AZE, BLR, BIH, FIN, FYR, GEO, IRL, KAZ, KGZ, MLT, MDA, MNE, RUS, SRB, SWE, CHE, TJK, TKM, UKR, UZB
 - MD: DZA, EGY, ISR, JOR, MRT, MAR, TUN
 - GLOBAL PARTNERS: AFG, AUS, IRQ, JPN, KOR, NZL, PAK



Research and Technology Organization -Today

North Atlantic Council

MC

CNAD

**S&T
Reform**

RTO

R&T Agency

Board

R&T Board

Panels

SAS
(Systems,
Analysis,
Studies)

SCI
(Systems,
Concepts &
Integration)

SET
(Sensors
Electronics
Techn.)

IST
(Informatio
n Systems
Techn.)

AVT
(Applied
Vehicle
Techn.)

HFM
(Human
Factors &
Medicine)

MSG
(Modeling
&
Simulation
Group)

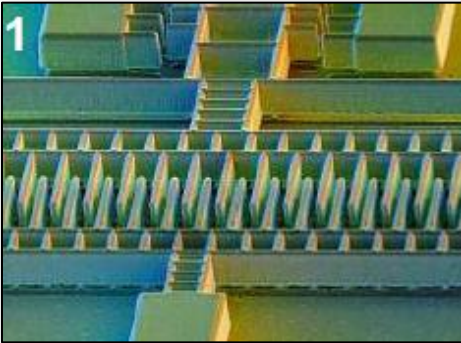
Teams

Constant Average of 150 Technical Teams
approx. 3,500 NATO and National Scientists and Experts

❖ Of the seven panels, only AVT conducts semi-annual Panel Business Meetings and has done so for 14 years.

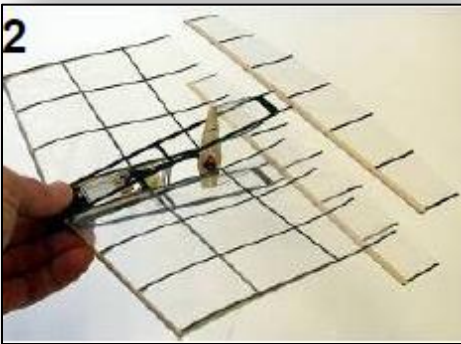


Technology Areas in AVT



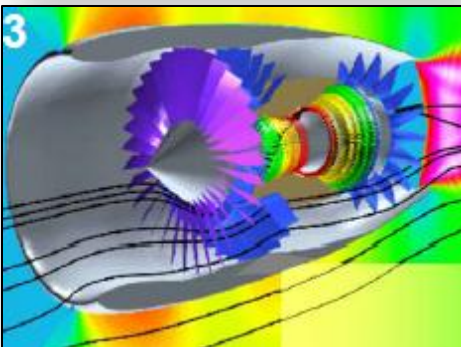
1. Mechanical Systems, Structures, and Materials

- vehicle and platform design; structural loads and dynamics; noise and vibration control; smart and multifunctional materials and structures; structural materials and manufacturing processes; non-structural materials; corrosion, fatigue and other degradation mechanisms; affordability, availability, survivability and supportability; reliability and maintenance



2. Performance, Stability & Control, Fluid Physics

- performance; stability and control; aerodynamic and hydrodynamic analysis and design; theoretical, experimental and computational fluid dynamics; aerothermodynamics; aero-and hydro-acoustics; aeroservoelastics



3. Propulsion and Power Systems

- focusing on engineering of propulsion systems; fuels and energy conversion; fluid and gas dynamics
- Addressing airbreathing engines, auxiliary onboard power generation units, solid and liquid propellant rockets, electrical systems, and fire protection and suppression



AVT-196 Impact of Scarcity of Materials in Military Mechanical, Structural, Propulsion, and Power Systems

- Members from USA, GBR, CAN, FRA, DEU, NLD, ITA, and TUR project an official start date of Jan 2012, end of Oct 2014
- Due to the importance, unofficial start May 2011 with follow-on Oct 2011
- Deliverable is NATO technical report, NATO NU, and possibly a workshop



AVT-196 Impact on Scarcity of Material Availability in Military Systems

Why the Concern?

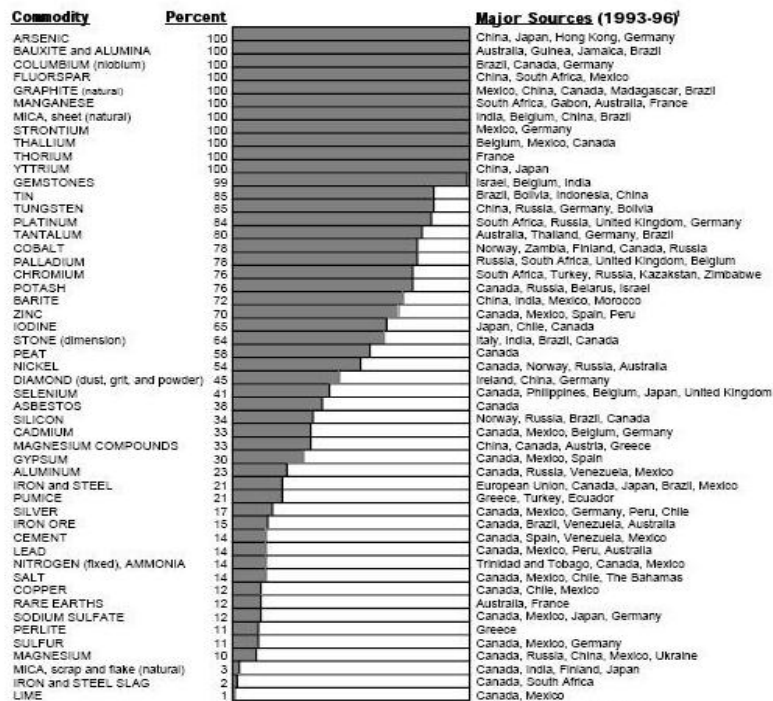
- Supply chain vulnerabilities and foreign supply
 - China and Rare Earths
 - Africa and conflict minerals
- Declining budgets and emphasis maintaining systems
- Production delays or non-availability

National Security Jeopardized



US Reliance on Imports is Expanding at an Accelerated Rate

1997 U.S. NET IMPORT RELIANCE FOR SELECTED NONFUEL MINERAL MATERIALS

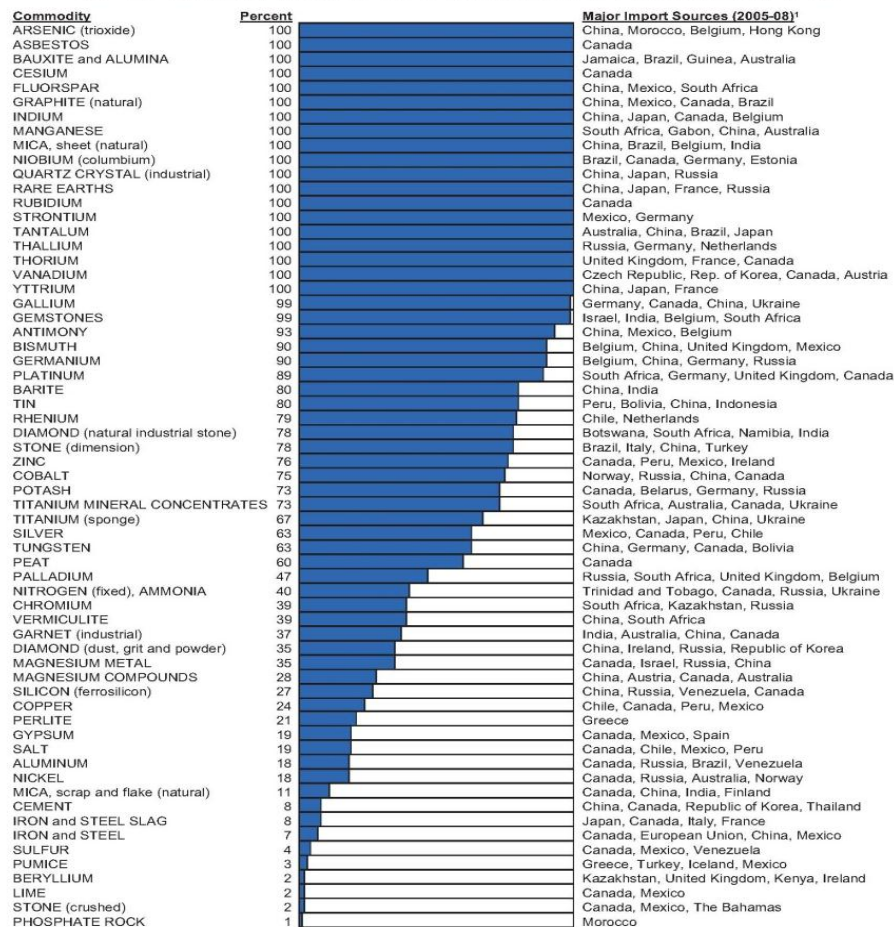


Additional commodities for which there is some import dependency but data are withheld or are insufficient to determine import-reliance levels:

Antimony	China, Mexico, Bolivia, South Africa	Mercury	Russia, Canada, Spain, Kyrgyzstan
Bismuth	Mexico, Belgium, China, United Kingdom, Canada	Rhenium	Chile, Germany, Netherlands, United Kingdom, Russia
Gallium	France, Russia, Canada, Germany, Hungary	Rutile	Australia, South Africa, Sierra Leone
Germanium	Russia, United Kingdom, China, Belgium, Ukraine	Titanium (sponge)	Russia, Japan, China, Kazakhstan
Ironite	South Africa, Australia, Canada	Vanadium (ferrovanadium)	Russia, Canada, Belgium, Austria
Indium	Canada, Russia, France, Italy, China	Vermiculite	South Africa, China
Kyanite	South Africa	Zirconium	Australia, South Africa

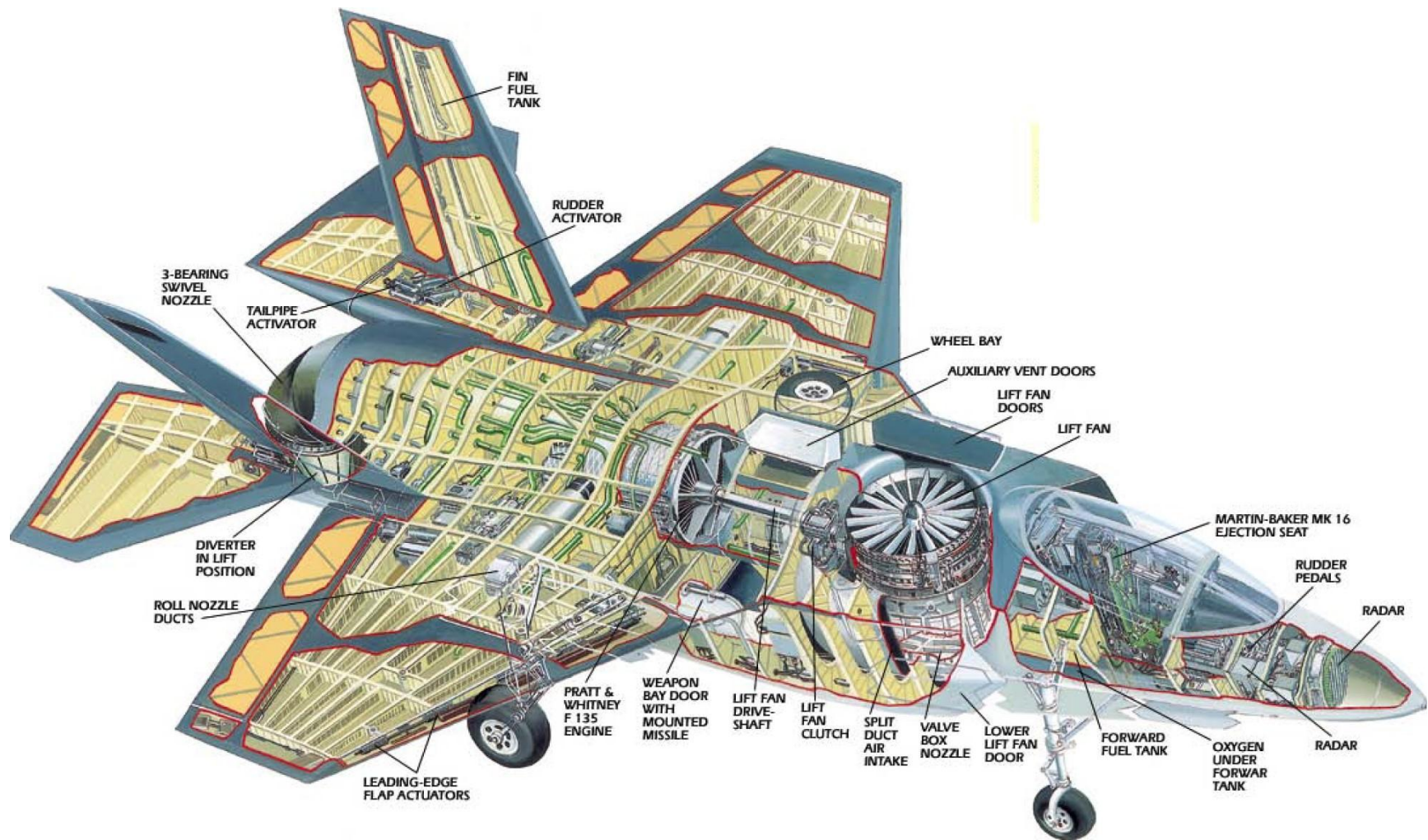
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2009 U.S. NET IMPORT RELIANCE FOR SELECTED NONFUEL MINERAL MATERIALS



¹In descending order of import share.

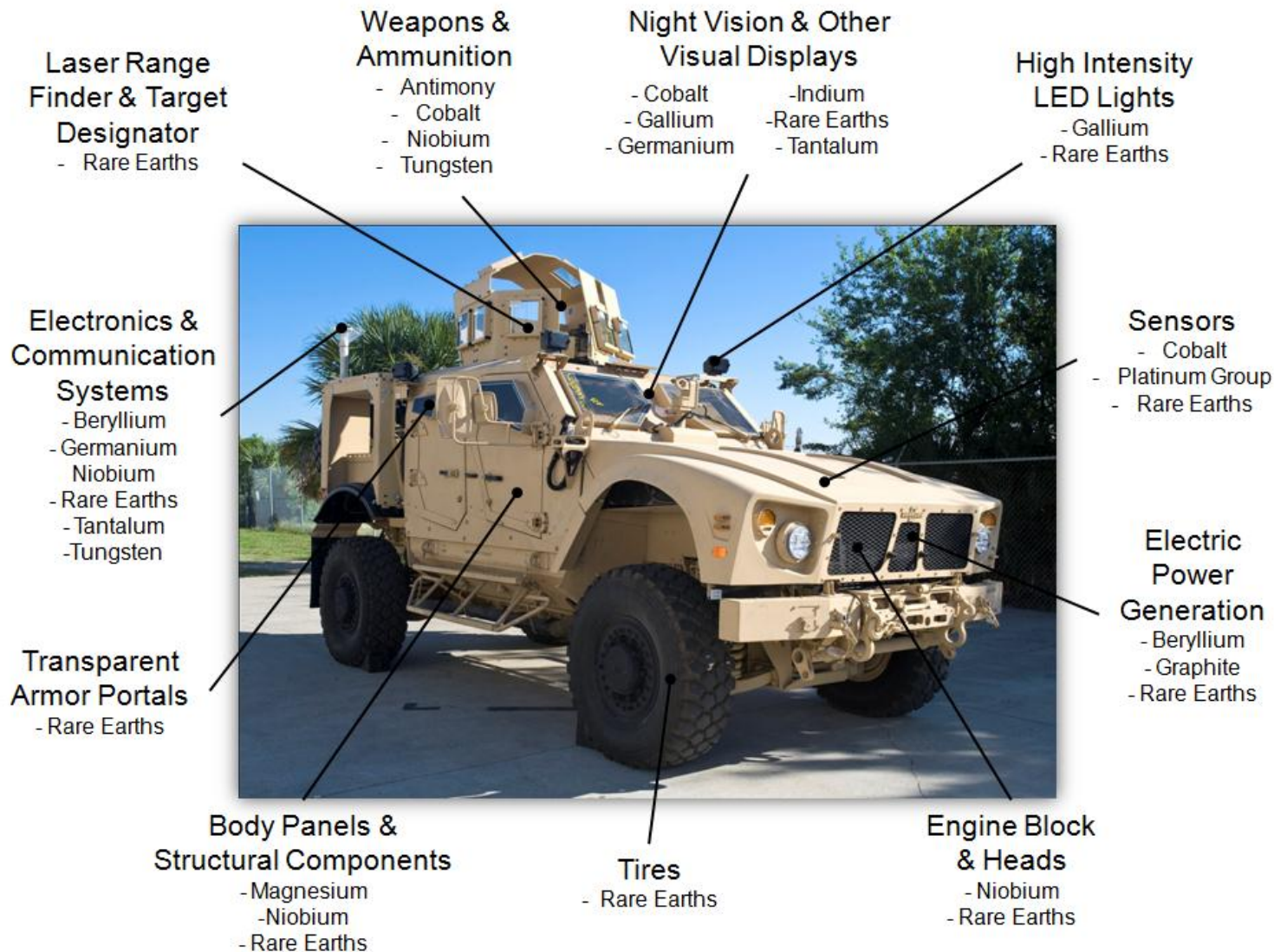
from USGS Mineral Commodity Summaries



- Strategic or critical materials used in virtually every part of aircraft



The 14 “EU Critical Materials” Are Essential for the Manufacture of Many Important Ground Vehicle Components and Systems





AVT-196 Progress

- Identify military vehicle examples and material content
 - Identify materials
 - Prioritize materials by use, availability
 - Assess impact of material non-availability on production
- Review/Analyze Global Supply Chains for vulnerable materials



AVT-196 Progress (continued)

- Develop mitigation strategies to include:
 - Alternate/new technologies
 - Substitute materials
 - Material buffer stocks or strategic sourcing
 - Limited stockpiling
- Provide recommendations



Advantages of Collaborative Effort

- U.S. and NATO share common concern
- Working Group represents an expanded and diversified technical base and expertise that benefits DoD and NATO
- Potential to partner to share key strategic/critical materials, common parts and components
- Potential to partner with allies to introduce additional projects of mutual interest



Future Meetings

- 2012 Spring meeting—San Diego, CA (completed)
- 2012 Fall meeting— France
- 2013 Spring meeting—Sweden
- 2013 Fall meeting—Latvia



Questions??

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